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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/631,623	08/04/2000	Yukihiro Nagai	50090-233	2307

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EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/631,623

Applicant(s)

NAGAI ET AL.

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Remarks

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1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. Claims 1-4 and 6-7 are pending in this application.

Information Disclosure Statement

2. Acknowledgment is made of receipt of applicant's Information Disclosure Statement (PTO-1449) filed June 27, 2002.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Antecedent basis for the claimed subject matter in claim 7, lines 2-3 is required, namely: the phrase "a plurality of trenches are formed adjacently in the active region, an etching stopper film is embedded...", which phrase is not disclosed in the description section of the specification.

Claim Objections

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4. Claim 7 is objected to because of antecedent basis as explained above:

Examiner suggests that "a plurality of trenches are formed adjacently in the semiconductor substrate". Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claim 4 is rejected under 35 U.S.C. 102(e) as being anticipated by Bracchitta et al. (US 6,130,469).

Bracchitta discloses a semiconductor device comprising (Fig.4):

a semiconductor substrate (30); at least a trench formed in the semiconductor substrate; a surface insulating film (42) formed along a surface of the trench of the semiconductor substrate; and a conductive film (40) formed on the surface insulating film; wherein the surface insulating film is broken down for forming an electric fuse. See also Col.2, line 65 – Col.3, line 7. Although, Bracchitta does not explicitly teach the surface insulating film is sufficiently thin to be broken down, this feature is inherent because the surface insulating film of Bracchitta also functions as the electric fuse.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 1-3 & 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bracchitta et al. (US 6,130,469).

Regarding claim 1, Bracchitta discloses a semiconductor device comprising (Fig.4):

a semiconductor substrate (30); a first portion of the semiconductor substrate comprising a plurality active regions; a second portion of the semiconductor substrate comprising at least one trench having an interior surface; a surface insulating film (42) formed on a surface of the active regions in the first portion and on the interior surface of said at least one trench in the second portion; and conductive film (40) formed on the surface insulating film, wherein the surface insulating film functions as an electric fuse.

See also Col.2, line 65 – Col.3, line7.

Bracchitta does not explicitly teach the surface insulating film is sufficiently thin to be broken down, this feature is inherent because the surface insulating film of Bracchitta also functions as the electric fuse.

Bracchitta does not explicitly teach a plurality of isolation regions separating the active regions. However, it is noted in the art that an isolation trench is used in an active area associated with microelectronic device on a semiconductor substrate. Thus, it would have been obvious in the art at the to form isolation regions in VLSI ICs, since isolation trenches allow microelectronics devices to be placed increasingly closer to each other without causing detrimental electronic interaction such as unwanted capacitance build-up and cross-talk.

Regarding claim 2, Bracchitta discloses the semiconductor device further comprising:

a plurality of surface insulating films formed on a surface of the active regions in the first portion; and a plurality of conductive films formed on each of the insulating films in the first portion; wherein one of the surface insulating films is formed on the interior surface of said at least one trench in the second portion and is capable of functions as an electric fuse.

Regarding claim 3, Bracchitta discloses the plurality of surface insulating films are gate oxide films; and the plurality of conductive films are gate electrodes.

Regarding claim 6, Bracchitta does not teach a plurality of trenches are formed adjacently, and a surface insulating film and a conductive film are formed in each trench. It would have been obvious in the art at the time the invention was made to form the plurality of trenches and a surface insulating film and a conductive film are formed in each trench, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Allowable Subject Matter

9. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: No prior art teaches forming a plurality of trenches and an etching stopper film

is embedded in a selected one of the trenches and a surface insulating film and a conductive film are formed in other trenches. The etching stopper film prevents excessive abrasion, which would otherwise be caused during a CMP process.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DHK
September 25, 2002

Steven Loh